PROCEEDINGS

OF THE

ACADEMY OF NATURAL SCIENCES

OF PHILADELPHIA.

1857.

January 20th.

COL. M'CALL in the Chair.

Communications intended for publication in the Proceedings were presented, entitled:

Catalogue of the species of Bembidium found in the United States and contiguous northern regions. By John L. LeConte, M. D.

Index to the Buprestidæ of the United States, described in the work of Laporte and Gory, with notes. By John L. LeConte, M. D.

Description of several new Mammals, from Western Africa. By John LeConte.

Aluminium; the progress in its manipulation. W. J. Taylor.

Catalogue of birds collected by P. B. Du Chaillu, on the river Muni, Western Africa, with descriptions of new species. By John Cassin.

Which were severally referred to Committees.

On leave granted, Dr. Leidy introduced a memorial to Congress, praying that a report be ordered to be prepared on the collections of Natural History, recently made by the North Pacific Exploring Expedition, under Com. Rodgers; which was referred to a Committee with power to act.

January 27th.

Vice-President BRIDGES in the Chair.

The Annual Report of the Publication Committee was read and adopted.

In accordance with the By-laws, an election for members of the standing Committees for the present year was held, with the following result:—

Ethnology.

J. Aitken Meigs,	S. S. Haldeman,	T. G. Morton.

Comparative Anatomy and General Zoology.

Joseph Leidy,	Jas. M. Corse,	W. H. Gobrecht.

Mammalogy.

John LeConte,	Geo. A. M'Call,	Wm. Camac.

Ornithology.

John Cassin,	Geo. A. M'Call,	S. W. Woodhouse.

Herpetology and Ichthyology.

Edw. Hallowell,	R. Bridges,	J. C. Morris.

Conchology.

T. A. Conrad,	T. B. Wilson,	W. G. Binney.

Entomology and Crustacea.

R. Bridges,	John A. Guex,	F. Schafhirt.

Botany.

E. Durand,	S. S. Garrigues,	A. J. Brasier.

Geology.

Isaac Lea,	Chas. E. Smith,	John L. LeConte.

Mineralogy.

W. S. Vaux,	S. Ashmead,	F. A. Genth.

Palæontology.

T. B. Wilson.	Joseph Leidy,	T. A. Conrad.

Physics.

B. H. Rand,	Fairman Rogers,	W. M. Uhler.

Library.

W. S. Vaux,	R. Pearsall,	Joseph Jeanes.

Proceedings.

J. Aitkin Meigs,	Joseph Leidy,	Geo. A. M'Call.

The following papers, on report of the Committees to which they had been referred, were ordered to be published in the Proceedings.

Catalogue of the species of BEMBIDIUM found in the United States and contiguous Northern Regions.

BY JOHN L. LECONTE, M. D.

On revising recently my collection of the species of the genus named above, I regretted to find, that in former years I had been led to describe as distinct species, many which a more practiced eye now leads me to consider as varieties. The number, also, of well-defined species, being very great, I have thought it important to attempt to separate them into definite groups, which, by containing a comparatively small number of species, would facilitate the subsequent labors of the student endeavoring to identify his specimens.

With this object in view, I sought the divisions established by Jacquelin Du Val, in his admirable treatise "*De Bembidiis Europaeis*"* among our own species, but was much disappointed to find them not at all applicable. After repeated trials to reduce a system on the characters of Du Val, which should present a natural series when applied to the species before me, I was at length compelled to adopt another method of division, the result of which is presented below.

But first with regard to the limits of Ochthedromus *Lec.* and its claims to regard as a natural genus. European entomologists have thus far refused to place it in their system, adhering to the view that the subulipalpate Carabica, with few exceptions, (Anillus is received by all, Thalassobius and Tachypus by a few) form but one great genus Bembidium. From this view I ventured to dissent many years ago, but more distinctly in my notes on the classification of the Carabidæ of the United States,* where the Trechi and Bembidia were widely separated on a difference in the mesothoracic parapleuræ; these in the former are divided by a suture near the posterior margin, and in the latter by a diagonal suture. I also found that in the Trechi the marginal stria of the elytra was interrupted at the middle, while in the Bembidia it was entire. Renewed observation has confirmed the result then obtained, and has induced me still farther to enlarge the group of Trechi, by adding to it not only Tachys, but also Anillus, the form recognized by me as Blemus, (which is probably not genuine Blemus), and Lymnæum, which has been found on the coast of California, at San Diego.

Thus of the genera in my table (loc. cit. 397) there remains only Pericompsus, Bembidium, Octhedromus, Hydrium, and Patrobus. The last named genus must form a group by itself, or at least separate from Bembidium, and more nearly allied to Pterostichus, or Platynus. Hydrium does not appear to be sufficiently definite to be retained.

Of the three genera thus retained, Pericompsus is known by the anterior tarsi of the male being hardly or not at all dilated, by the anterior tibiæ being obliquely truncate at tip, and by the elytra being without scutellar striæ: the mentum tooth is small and acute. Bembidium and Ochthedromus differ from Pericompsus only by the male having two joints of the anterior tarsi dilated, by the anterior tibiæ being somewhat rounded at tip, and by the elytra having a short scutellar stria. They differ among themselves by the comparative size of the middle portion of the mentum, which in the species with impressed square spots is longer and broader than in the others, and also in the comparatively larger size of the first dilated joint of the anterior tarsi in the same species. Nevertheless, taking into account the great variations in character, especially of the mentum, in other groups, it seems to me more natural again to unite them into one genus, to be called Bembidium. And with a view of shewing the relations between the different groups, the following table may be made use of.

BEMBIDIUM Latr.

Legio 1ma. Elytra humeris subangulatis, stria 8va a margine remota, interstitio 3io punctigero.

A. Mentum dente brevi bicuspi; elytra striis abbreviatis.

I. Elytra interstitiis seriatim parce punctatis, setiferis. (*Hydrium* Lec.)
II. Elytra glabra, interstitio 3io bipunctato. (*Eudromus* Kirby.)

B. Mentum dente magno, integro: elytra striis integerrimis.

III. Elytra interstitio 3io bipunctato et foveis quadratis impresso. (*Bembidium* Lec.)
IV. Elytra interstitio 3io bipunctato, haud foveato.

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* Annales de la Soc. Entom. de France, 2nd Ser. 9, 462.
† Trans. Am. Phil. Soc. vol. x, 379.

Legio 2nda. Elytrorum stria 3ia bipunctata :

A. Stria 8va ad marginem modice approximata.

V. Elytra humeris subangulatis, stria 5ta ad apicem extensa.

Elytra humeris rotundatis, striis antice fortiter punctatis, 5ta vel 7ma ad apicem extensa :

VI. Subdepressa, elytrorum striis integris vel postice parum obliteratis.

VII. Convexa, elytrorum striis postice valde obliteratis.

B. Stria 8va ad marginem valde approximata ; humeris rotundatis.

VIII. Thorax planus trapezoideus, utrinque ad basin bifoveatus ; elytra tenuiter striata ; antennæ et pedes nigri.

IX. Thorax planus trapezoideus, ad basin late foveatus (vel vix bifoveatus), fovea externa minuta ; elytra striis profundis sæpe abbreviatis ; antennarum basis et pedes testacei. (*Peryphus* p.)

X. Thorax convexus subcordatus, fovea basali externa breviore ; elytra striis profundis sæpe abbreviatis ; antennarum basis et pedes præcipue testacei, raro nigri. (*Peryphus* p.)

Legio 3ia. Elytra humeris rotundatis, interstitio 3io punctigero.

A. Linea humerali haud hamata.

a. Striæ frontales normales ; striæ elytrorum nonullæ integræ, (8va ad marginem approximata).

XI. Elytra interstitio 3io tripunctato.

XII. Elytra interstitio 3io bipunctato.

§ Caput subtilissime granulatum.

§§ Caput nitidum læve.

b. Striæ frontales convergentes, vel sæpe duplices ; elytrorum omnes dorsales abbreviatæ.

XIII. Striæ frontales duplices integræ vix convergentes ; thorax cordatus truncatus, angulis posticis carinatis.

XIV. Striæ frontales duplices obliquæ, exteriore interrupta ; thorax cordatus truncatus, angulis posticis carinatis.

XV. Striæ frontales duplices obliquæ, exteriore interrupta ; thorax cordatus pedunculatus, angulis posticis minutis haud carinatis.

XVI. Striæ frontales obliquæ antice conniventes ; thorax cordatus truncatus, angulis posticis carinatis.

c. Striæ frontales normales ; elytrorum omnes abbreviatæ.

XVII. Thorax cordatus ; elytrorum interstitio 3io bipunctato.

XVIII. Thorax cordatus ; elytra interstitiis seriatim punctatis.

B. Linea humerali hamata, cum stria 5ta coniuncta, hac integra.

XIX. Thorax trapezoideus, angulis posticis carinatis, elytris iridescentibus.

Catalogue of Species.

I. 1. B. l æ v i g a t u m Say.

II. 2. *Eudromus* n i t i d u s Kirby.

III. 3. B. p u n c t a t o - s t r i a t u m Say ; *stigmaticum* Dej. ; ? *sigillare* Say. 4. B. i m p r e s s u m Gyll. Kirby; *Carabus impressus* Fabr. 5. B. p a l u d o s u m Sturm, Lec. ; *lacustre* Lec. 6. B. i n a e q u a l e Say ; *arenarium* Dej.

IV. 7. *Odontium* c a r i n a t u m Lec. 8. B. c o x e n d i x Say ; *nitidulum* Dej.

V. 9. *Ochth.* b i f o s s u l a t u s Lec. 10. B. a m e r i c a n u m Dej. 11. *Ochth.* d i l a t a t u s Lec. 12. B. a n t i q u u m Dej. ; ? *honestum* Say ; var. *Ochth. basalis* Lec. 13. B. c h a l c e u m Dej.

VI. 14. *Ochth.* s a l e b r a t u s Lec. ; var. *O. purpurascens* Lec. 15. O. l o n g u l u s Lec. ; var. *O. subæneus* Lec.

VII. 16. B. n i g r u m Say.

VIII. 17. *Ochth.* planatus Lec. 18. *O.* simplex Lec. 19. B. planiusculum Mann. 20. *Peryphus* complanulus Mann. 21. B. incertum Mann.; *Notaphus incertus* Motsch. 22. *Peryph.* tetraglyptus Mann.

IX. 23. *Ochth.* fugax Lec.; *O. planipennis* Lec. 24. *Peryphus* planus Hald. 25. *O.* perspicuus Lec. 26. B. transversale Dej., var. *O. compar* Lec. 27. *O.* Mannerheimei Lec.; *B. transversale*‡Mann. 28. B. lugubre Lec. (infra).

X. § Antennarum basis et pedes testacei vel rufi. 29. *Ochth.* striola Lec. 30. *Peryph.* bimaculatus Kirby. 31. *Ochth.* lucidus Lec.; var. *O. substrictus* Lec. 32. B. rupestre Dej.: *Carabus rup.* Fabr.; *B. tetracolum* Say; *Peryph. rupicola* Kirby.; '*Carabus Andreæ* Fabr.'‡Er. '*Carabus ustulatus* Linn.' fide DuVal. 33. B. postremum Say; *P. scopulinus* Kirby. 34. *Peryph.* picipes Kirby. 35. *Ochth.* gelidus Lec. Many of this group have a very wide distribution, and No. 32 is even found upon both continents.

X. §§. Antennarum basis et pedes toti nigri. 36. *Ochth.* aratus Lec. 37. *Ochth.* nitens Lec.; *Peryph. picipes*‡Mann. The latter is found at Lake Superior and in Russian America.

XI. 38. *Ochth.* sexpunctatus Lec.

XII. §. Caput subopacum, subtilissime granulatum. 39. *Ochth.* insulatus Lec. 40. *O.* cordatus Lec. 41. *O.* laticollis Lec. 42. B. nigripes Mann.; *Notaphus nigripes* Kirby. 43. *O.* approximatus Lec.; var. *O. consentaneus* Lec. 44. B. indistinctum Dej. 45. B. fraternum Lec. (infra). 46. *Notaphus* viridicollis Ferté. 47. B. dorsale Say. 48. *O.* umbratus Lec. 49. *O.* tesselatus Lec. 50. B. patruele Dej. 51. *O.* æneicollis Lec. 52. B. variegatum Say; var. *Not. posticus* Hald. 53. *O.* rapidus Lec. 54. O. versicolor Lec.; *Not. variegatus*‖Kirby. 55. *O.* timidus Lec. 56. *O.* pictus Lec. 57. B. contractum Say, Dej.; var. *O. constrictus* Lec.

XII. §§. Caput nitidum læve. 58. *Ochth.* ephippiger Lec. 59. *O.* grandicollis Lec. 60. *O.* vilis Lec.

XIII. 61. *Ochth.* sulcatus Lec.; *trepidus* Lec.

XIV. §. Antennarum basis pedesque testacei. 62. B. affine Say.; *fallax* Dej.; *decipiens* Dej.

XIV. §§. Antennarum basis pedesque nigri. 63. *O.* dubitans Lec. 64. *O.* cruralis Lec.

XV. 65. *O.* axillaris Lec. 66. B. quadrimaculatum Gyll.; *oppositum* Say; *Cicindela 4-maculatum* Linn. 67. B. pedicellatum Lec. (infra.)

XVI. 68. *Ochth.* angulifer Lec. 69. *O.* connivens Lec. 70. *O.* cautus Lec. 71. *O.* frontalis Lec.

XVII. 72. *Ochth.* mundus Lec.

XVIII. 73. *Leia* semistriata Hald.

XIX. 74. *Ochth.* trechiformis Lec. 75. *O.* iridescens Lec.

Species unknown to me.

VII?. Bemb. breve Mann.; *Peryphus brevis* Motsch. Perhaps belongs to II.

VIII. Bemb. Kuprianovii Mann. B. biimpressum Mann. B. quadrifoveolatum Mann.

X. §§. *Peryphus* concolor Kirby.

XII. §. Bemb. undulatum Sturm, (fide Mann. Bull. Mosc. 1853). *Notaph.* quadraticollis Mann.

XIII. Bemb. fortistriatum Mann.; *Omala fortestriata* Motsch. Perhaps not different from B. sulcatum Lec., which is found at Lake Superior.

Bemb. glabriusculum Mann. Bull. Mosc. 1853, cannot be referred to any of the divisions above defined.

The following two species described by Kirby, (Fauna Bor. Am. 4) are probably identical with some above named. *Peryphus* sordidus (perhaps No. 30); *Notaphus* intermedius.

The following are not recognisable, owing to the imperfection of the characters given: *Peryphus* concolor||Motsch. (Carab. Russ. 9.) *P.* erosus Motsch. (ibid. 10). *Lopha* bifasciata Motsch. (ibid. 12). *Omala* polita Motsch. (Bull Mosc. 1845, 1, 29) perhaps is B. angulifer Lec. (No. 68.)

Descriptions of new species.

28. B. lugubre, subdepressum, nigrum obscure virescens, thorace latitudine paulo breviore, lateribus rotundatis, postice oblique angustato, marginato, ad basin truncato, angulis posticis subrectis haud rotundatis, fovea utrinque basali profunda parce punctata, elytris striis parum impressis antice punctatis, postice obliteratis, 3ia bipunctata, 7ma haud conspicua, ad apicem obsolete piceis; subtus nigrum, antennarum basi, palpis pedibusque rufis. Long. ·28.

One specimen collected by Mr. Schott in the valley of the Rio Grande. Of the same size as B. transversale, but with the thorax smaller and more narrowed behind; the striæ of the elytra are less impressed, and the 7th is altogether wanting.

45. B. fraternum, depressum, obscure æneo-olivaceum, capite thoraceque subtilissime granulatis, hoc latitudine paulo breviore, postice subangustato, lateribus rotundatis postice breviter sinuatis, angulis rectis carinatis, basi utrinque bistriato, haud punctato, elytris striis ante medium fere fortiter punctatis, versus apicem subobliteratis, 5ta ad apicem extensa; interstitiis planis, 3io bipunctato; fasciis duabus undulatis solitis angustis interruptis apiceque testaceis, antennarum articulo 1mo pedibusque rufis. Long. ·18.

One specimen found by me in Habersham County, Georgia. The thorax is formed nearly as in B. viridicolle, and is narrower and more sinuate on the sides than in B. patruele; from both species it is distinguished by the striæ of the elytra being almost obliterated towards the tip, but tolerably strongly punctured at base.

67. B. pedicellatum, æneo-nigrum, convexum, nitidum, thorace cordato, latitudine breviore, postice maxime angustato, angulis posticis minutis, ad basin pedunculato, marginato, utrinque fovea minuta impresso, elytris punctis majusculis striatis, pone medium lævigatis, macula triangulari pallida magna humerali utrinque ornatis, antennis palpis pedibusque testaceis. Long. ·12.

One specimen found in Lancaster Co., Pennsylvania, by Mr. S. S. Rathvon. Of the same form and size as B. 4-maculatum, but the elytra are more strongly punctured, and the posterior pale elytral spot (as in B. axillare) is entirely wanting. Six joints of the antennæ that remain, are of a uniform reddish yellow.

Index to the BUPRESTIDÆ of the United States, described in the work of Laporte and Gory, with notes.

BY JOHN L. LECONTE, M. D.

Having recently procured, after many exertions, a complete copy of the Histoire Naturelle et Iconographie des Insectes Coléoptères, by MM. Laporte and Gory, I have thought that a catalogue of the native species of Buprestidæ described in the work, which has heretofore been inaccessible to the American student, would, perhaps, tend to the more easy recognition of many of our species. In consequence of the confusion which now reigns among the genera of the family mentioned, the time is not yet propitious for a synopsis of all the native species; but with the appearance of the fourth volume of Lacordaire's work on the Genera of Coleoptera, this difficulty will be removed, and the real characters of the misconceived and wrongly described genera now mentioned in the books will be recognized. In the meantime, however, the synonymical aid to be derived from reference to the monograph of Laporte and Gory must not be overlooked.

The dates of publication are as follows: vol. 1; 1837: vols. 2 and 4; 1841.

ACMÆODERA Esch.

1. A. flavomarginata Gray, L. & G. 1, 2; tab. 1, 2. (Guatimala); Texas.
2. A. ornata L. & G. 1, 6; tab. 2, 7.
3. A. volvulus (Fabr.) L. & G. 1, 6; tab. 3, 8. *B. pulchella* Herbst, Say. The locality is incorrectly given as Columbia.
4. A. tubulus (Fabr.) L. & G. 1, 11; tab. 3, 15. *B. culta* Weber; *B. geranii* Harris. The locality is misplaced as in the preceding.
5. A. flavosignata L. & G. 4, 30; tab. 6, 28. Certainly a variety of No. 3.
6. A. dispar L. & G. 4, 31; tab. 6, 29. Perhaps a variety of the preceding.

APATURA Lap. & Gory.

1. A. Drummondi Kirby; L. & G. 1, 3; tab. 1, 3. Oregon and California. The species from Siberia considered by Mannerheim as identical, is on comparison seen to be quite distinct.
2. A. octospilota L. & G. 1, 4; tab. 1, 4. This is merely a variety of A. croceosignata with large spots.
3. A. notata L. & G. 1, 4; tab. 1, 5.
4. A. croceosignata L. & G. 1, 5; tab. 1, 9. Lake Superior and Middle States.
5. A. decolorata L. & G. 1, 5; tab. 1, 7. This is merely an unspotted variety of the preceding.
6. A. caudata L. & G. 1, 8; tab. 2, 13. This species is unknown to me: the figure somewhat resembles Dicerca lurida, and presents rows of punctures not mentioned in the description.
7. A. appendiculata L. & G. 1, 8; tab. 2, 14, is *Buprestis longipes* Say; the posterior angles of the thorax in the American specimens are less prominently rectangular, and the sides are less perceptibly sinuate than in those from Europe, but the difference appears one rather of race than species.

BUPRESTIS Linn.

1. B. liberta L. & G. 2, 11; tab. 2, 6. Not B. liberta Germar, but a species not yet named from the Southern States, B. Georgiana Lec.
2. B. virginiensis Herbst, L. & G. 2, 11; tab. 2, 7.
3. B. borealis L. & G. 2, 13; tab. 3, 9. This is the true B. liberta Germ.
4. B. substrigosa L. & G. 2, 13; tab. 3, 10. This is B. campestris Say; *Chalcophora Langeri* Chevr.
5. B. Drummondi L. & G. 2, 37; tab. 9, 44; from Mexico, is perhaps Dicerca Woodhousei, valens or Webbii Lec.; the two last named are described in the Report on the U. S. and Mexican Boundary, not yet published.
6. B. clara L. & G. 2, 41; tab. 10, 50. "Amerique boreale." Unknown to me; certainly not from the U. States.
7. B. punctulata Schönh. L. & G. 2, 99; tab. 25, 134. *B. transversa* Say.
8. B. tuberculata L. & G. 2, 99; tab. 25, 135. *B. scobina* Chevr.
9. B. pugionata‡ L. & G. 2, 99; tab. 26, 136. Not at all B. pugionata Germ.; it is named in my collection Dicerca lepida.
10. B. obscura Fabr. L. & G. 2, 103; tab. 26, 141. *B. baltimorensis* Herbst.
11. B. consimilis L. & G. 2, 104; tab. 27, 142. This figure is very similar to that of B. costicollis, but the description is valueless.
12. B. asperata L. & G. 2, 105; tab. 27, 142. *Dicerca chrysea* Mels.; *D. molitor* Mels.
13. B. lurida Fabr. L. & G. 2, 105; tab. 27, 144.
14. B. sexnotata L. & G. 2, 129, tab. 32, 178. A very bright colored variety of B. maculiventris Say.

14′. B. magica L. & G. 2, 138 ; tab. 34, 189. A Brazilian species ; a specimen imported into Massachusetts is the B. *coronata*‡ Harris, Cat. Ins. Mass.

15. B. rufipes Fabr. L. & G. 2, 139 ; tab. 34, 191.

16. B. lineata Fabr. L. & G. 2, 143 ; tab. 35, 196.

17. B. fasciata Fabr. L. & G. 2, 144 ; tab. 35, 198.

18. B. decora Fabr. L. & G. 2, 145 ; tab. 36, 199.

19. B. aurulenta Linn. L. & G. 2, 146 ; tab. 36, 200. Appears to be a bright colored variety of B. striata.

20. B. Bosci L. & G. 2, 146 ; tab. 36, 201.

21. B. striata Fabr. L. & G. 2, 147 ; tab. 37, 202.

22. B. impedita Say, L. & G. 2, 148 ; tab. 26, 203. An elongate variety of B. striata.

23. B. ornata Gory, 4, 93 ; tab. 16, 90. Undoubtedly not found in the United States.

24. B. Lecontei Gory, 4, 107 ; tab. 18, 104. A species of Dicerca from Georgia, but unknown to me.

25. B. spreta Gory, 4, 108 ; tab. 19, 105. Dicerca *impressifrons* Mels.

25. B. pruinosa Gory, 4, 109 ; tab. 19, 106. A Dicerca, unknown to me ; said to be from New Orleans.

26. B. costicollis Gory, 4, 109 ; tab. 19, 107. Also a Dicerca described previously as B. thureura Say.

27. B. erecta Gory, 4, 110 ; tab. 19, 108. ? B. divaricata Say ; Dicerca *aurichalcea* Mels. ; *D. parumpunctata* Mels.

28. B. rusticorum Kirby ; Gory, 4, 117 ; tab. 20, 115. A species of Ancylochira found in Oregon and California, very similar to A. maculiventris.

29. B. maculipennis Gory, 4, 119 ; tab. 21, 117. This is most probably a variety of Ancyclochira lineata ; it was subsequently described as A. *inconstans* Mels.

30. B. consularis Gory, 5, 120 ; tab. 21, 118. An Ancylochira previously described as B. Nutalli Kirby.

31. B. erythropus Gory, 4, 126 ; tab. 22, 124. Unknown to me ; probably from tropical America.

POLYCESTA Serville.

1. P. Velasco L. & G. 2, 6 ; tab. 1, 7. Mexican, but recently found in Texas.

CHRYSOBOTHRIS Esch.

1. C. ultramarina‡ L. & G. 2, 13 ; tab. 3, 19. Does not in the least resemble B. ultramarina Say, which is an Ancylochira closely allied to B. decora Fabr. The present species must be called C. azurea, the name it bears in Dejean's Catalogue.

2. C. thoracica (Fabr.) L. & G. 2, 14 ; tab. 3, 20. This species is unknown to me, if it is not a variety of the preceding.

3. C. hybernata (Fabr.) L. & G. 2, 16 ; tab. 4, 24. Unknown to me if not a variety of the next.

4. C. viridipunctata L. & G. 2, 21 ; tab. 4, 31. Commonly considered as B. hybernata Fabr., and agrees with the description of that author.

5. C. atabalipa L. & G. 2, 43 ; tab. 8, 60. Mexican, but found abundantly in Texas.

6. C. quadriimpressa L. & G. 2, 48 ; tab. 9, 64. Our most common species, and usually considered B. femorata Fabr. ; C. *rugosiceps* Mels. is a variety.

7. C. femorata L. & G. 2, 48 ; tab. 9, 65. A large species named C. calcarata in my collection.

8. C. Lesueuri L. & G. 2, 49 ; tab. 9, 66. Cannot be identified with certainty.

9. C. Germari L. & G. 2, 50 ; tab. 9, 67. Perhaps a variety of the next, but cannot be certainly determined.

10. C. ignipes L. & G. 2, 50 ; tab. 9, 68.

11. C. dentipes‡ L. & G. 2, 52 ; tab. 9, 70. Not Germar's species, but probably a variety of C. femorata (*C. quadriimpressa* L. & G.)

12. C. scabripennis L. & G. 2, 53; tab. 9, 71.
13. C. pusilla L. & G. 2, 53; tab. 10, 72.
14. C. nigritula L. & G. 2, 54; tab. 10, 73.
15. C. posticalis L. & G. 2, 56; tab. 10, 76.
16. C. planata L. & G. 2, 56; tab. 10, 77. Commonly considered as C. dentipes Germ.
17. C. scitula Gory, 4, 160; tab. 27, 155. Perhaps a variety of the next.
18. C. chlorocephala Gory, 4, 161; tab. 27, 156. B. Harrisii Hentz.
19. C. errans Gory, 4, 172; tab. 28, 167. Unknown to me.
20. C. rugosula Gory, 4, 177; tab. 30, 172. Unknown to me.
21. C. floricola Gory, 4, 179; tab. 30, 175.
22. C. dissimilis Gory, 4, 181; tab. 31, 177. Not identified.
23. C. Alabamæ Gory, 4, 185; tab. 32, 183. A large not uncommon species.

AGRILUS Lap. & Gory.

1. A. latebrus L. & G. 2, 38; tab, 9, 50. Unknown to me if different from A. acutipennis.
2. A. ruficollis (Fabr.) L. & G. 2, 60; tab. 13, 78.
3. A. difficilis Gory, 4, 224; tab. 37, 215. *A. occidentalis* Uhler, Proc. Acad. Nat. Sc. 7, 416.
4. A. acutipennis Mann. Enum. Buprestides, 109; Gory, 4, 225; tab. 37, 216.
5. A. anxius Gory, 4, 226; tab. 37, 217.
6. A. quadriguttatus Gory, 4, 228; tab. 39, 219.
7. A. zemes Gory, 4, 234; tab. 39, 225. Unknown to me.
8. A. fuscipennis Gory, 4, 238; tab. 39, 230.
9. A. frenatus Gory, 4, 139; tab. 40, 231. Unknown to me.
10. A. cupricollis Gory, 4, 240; tab. 40, 232.
11. A. aurolineatus Gory, 4, 248; tab. 41, 240. A. bilineatus Say.
12. A. subcinctus Gory, 4, 252; tab. 42, 245.
13. A. obsoletoguttatus Gory, 4, 256; tab. 43, 249.
14. A. nigricans Gory, 4, 257; tab. 43, 250. Unknown to me.
15. A. egenus Gory, 4, 258; tab. 43, 251.
16. A. virens Gory, 4, 259; tab. 43, 252.

EUMERUS Lap. & Gory.

1. Eu. ignarus (Fabr.) L. & G. 2, 4; tab. 1, 5. *Buprestis cogitans* Weber.

CORÆBUS Lap. & Gory.

1. C. caliginosus L. & G. 2, 7; tab. 2, 9. Unknown to me.

ANTHAXIA Esch.

1. A. viridicornis (Say), L. & G. 2, 19, tab. 5, 25.
2. A. quercata (Fabr.) L. & G. 2, 21; tab. 5, 28.
3. A. æneogaster L. & G. 2, 32; tab. 7, 44. A California species, remarkable for its broad form.
4. A. viridifrons Gory, 4, 284; tab. 47, 277.
5. A. cyanella Gory, 4, 285; tab. 47, 278. *A. scoriacea* Mels.
6. A. cuneiformis Gory, 4, 290; tab. 48, 284.
7. A. flavimana Gory, 4, 291; tab. 49, 285.
8. A. bivittata Gory, 4, 292; tab. 49, 286. Unknown to me.

BRACHYS Solier.

1. B. alboguttata (Mann.) L. & G. 2, 2; tab. 1, 1. Buprestis gracilis Say; belongs to Taphrocerus Solier.
2. B. tesselata (Fabr.) L. & G. 2, 3; tab. 1, 2. *? Bupr. ovata* Weber.
3. B. terminans (Fabr.) L. & G. 2, 3; tab. 1, 3.
4. B. molesta Gory, 4, 332; tab. 56, 325.
5. B. æruginosa Gory, 4, 335; tab. 56, 329.

6. B. americana Gory, 4, 346; tab. 58, 343. Metonius purpureus Say. This and the next species belong to Solier's genus Pachyscelis, but the name given by Say has priority.

7. B, punctata Gory, 4, 347 ; tab. 59, 344. Metonius ovatus Say.

Decriptions of several new MAMMALS from Western Africa.

BY JOHN LECONTE.

Among a large collection of birds sent from Africa by M. du Chaillu, were a few species of Mammals, which have been referred to me for examination. The following is the result of my researches. Some of them appear to be new, at least I cannot find any thing like them described in any book in the possession of the Academy. I have hesitated about naming them, as some of them may be well known in Europe, but imperfectly described.

Semnopithecus anthracinus.

Entirely black, hair rather glossy, from two to three inches in length, over the eyes and on the top of the head coarse and bristly. Tragus broad. Thumb of the fore hands a mere oblong tubercle. Nails, except of the hind thumb, long and narrow. Tail very long, slightly tapering towards the point.

Length 2 feet 2 inches; tail 2 feet 7 inches ; arms 1 foot 6 inches; legs 1 foot 9 inches. Seems to resemble the Colobus satanas of Waterhouse, Lond. Mag. for 1838, p. 335, which was brought from the Island of Fernando Po. The length of the hair in the specimen sent to England is stated by the very accurate naturalist who describes it to be ten inches, whereas in our animal it rarely in any part exceeds two.

Cercopithecus buccalis.

Above and on the sides, hair deep cinereous, annulate with rufous beneath, and on the inner parts of the thighs grey. Hair of the head black, annulate like that of the back. Cheeks with a large yellow spot which extends even behind the ear ; behind the eye this spot appears to be bounded above by black. Arms and hands black, the hairs more or less tipped with rufous ; beneath, except near the hands, they are grey. Tail for one-third of its length, above the color of the back, beneath grey ; the rest of the tail is both above and beneath bright rufous, increasing in intensity to the end. Nails long, narrow and compressed. No callosities on the rump.

Length 1 foot 8 inches ; tail 2 feet 5 inches ; arms 8 inches ; legs 1 foot 2 inches.

Microcebus elegantulus.

Hair soft, dark cinereous, tipped with rufous brown, beneath with grey, the latter color extending somewhat towards the back from the axillæ and the groins, and on the forward edge of the legs and thighs ; tail longer than the body, cylindrical, bushy, the hair tipped with grey, and at its root for about one inch in length with rufous. Nose rather pointed. Ears large, oblong, naked except at the base ; lower fore teeth nearly horizontal ; nails of the fore hands round with an acumination ; nail of the hind thumb flat, of the first finger falciform and sharp ; of the other fingers like those on the fore hands.

Length 8 inches ; tail 12 inches ; head 1 foot 9 inches ; ears 1 inch.

Vespertilio pusillus.

Black, body beneath a little mixed with gray. Head short and small. Upper fore teeth four, distant by pairs, simple ; lower, six, trilobate ; nose not emarginate. Ears small, oval, orillon lanceolate and rather blunt. Interfemoral membrane naked except at the base ; tail projecting a little beyond the membrane.

Length 1·3 in. ; ears ·24 ; tail ·8 ; naked part ·05. Extent 6·9.

Sorex odoratus.

Dark cinereous brown above inclining to chestnut, beneath slightly paler. Snout proboscidal, deeply emarginate at the point, and furrowed on the under side. Ears large, naked, with two rather large lobes within, the lower one of which appears to be the antitragus ; tail long, triangular.

Length 5 inches ; head 1·65 ; tail 2·6 ; ears ·2.

This species has a very strong musky odor.

Sciurus subviridescens.

Above black, the hair tipped with pale brown, in some positions appearing greenish ; beneath pale yellowish cinereous ; tail longer than the body, of the same colors above and beneath, and tipped with black, not distichous. Head small. Ears rounded and very short, not tufted.

Length 6·7 in. ; tail 7·5 in. ; head 1·5 in. ; ears ·3.

Sciurus lemniscatus.

Above on the head, upper part of the back and legs rufous brown, mixed with darker and black. The back with four black stripes from the shoulders to the hinder parts of the body and two stripes of yellowish, with one of rufous (this last sometimes quite indistinct) down the middle of the back. Hair of the head annulate with black, of the sides dark cinereous tipped with pale rufous. Under side of the head, body and legs white. Head roundish ; nose pointed ; lower fore teeth slender ; ears small round. Tail distichous.

Varies in having the paler stripes scarcely apparent.

Length 7·5 in. ; tail 6·5 in.

Sciurus rufobrachiatus.

Louis Fraser, Zoologia typica No. 24 ; Waterhouse, Proc. Zool. Soc. 1842, p. 128.

This animal is figured in Audubon and Bachman's Quadrupeds of North America, under the name of Spermophilus annulatus. The specimen described by Dr. Bachman was purchased in New York from a dealer in preserved birds. It is by no means a native of our continent.

Sciurus pumilio.

Hair short and soft, dark cinereous, tipped with reddish brown, on the throat and belly with much paler. Head short roundish ; ears small ; tail shorter than the body, distichous ; hair reddish brown at base and tip, black in the middle, appearing by this disposition of colors to be edged with brown ; four of the toes on each foot equal.

Length 5·4 ; head ·7 . ear ·2 ; tail 2·3 ; fore leg ·9 ; hind leg 1·5.

ALUMINIUM.

The progress in its manufacture.

BY W. J. TAYLOR.

The use of sodium in the reduction of metals from their chlorides, as has been so successfully accomplished within the last two years, may be justly considered a great progressive step in science.

Aluminium has been the first in which this process has been perfected. What the other metals are which will be reduced successfully from their chlorides by the use of sodium, the future will determine. Some facts concerning the early history of aluminium, the progress made in its manufacture, and the numerous uses to which it can be applied, will not be uninteresting.

Much confusion existed in the minds of the early alchymists regarding the oxide alumina. They knew of an alum which was brought from the East, which they regarded for a long time as sulphuric acid combined with an earth. Stahl and others also mistook this earth for lime. Geoffroy, in 1728, pointed out its existence in clay ; Marggraff, in 1754, proved it to be a substance having a separate existence and peculiar characters. To Oerstedt belongs the credit of first preparing the chloride of aluminium, from which compound Wöhler, in 1827, succeeded in first eliminating the metal. Wöhler first obtained aluminium in the form of a grey powder, by heating gradually in a porcelain crucible over a spirit lamp equal volumes of metallic potassium and chloride of aluminium; other chemists, by slight modifications of this process, have obtained aluminium in the form of the grey powder, as first obtained by Wöhler.

To M. Sainte Claire Deville belongs the credit for first improving the process, so as to produce aluminium in such quantitles that its characters as a metal could be fully investigated. M. Ste. Claire Deville used in his process sodium as a substitute for potassium. (It requires 39 parts of potassium to produce the same reductive effect as 23 parts of sodium.) At the time of his first experiments sodium was worth one hundred dollars per pound; he so improved the process for making this metal as to reduce the price to ninety cents per pound.

At this time the chloride of aluminium was regarded with sodium as a curiosity of the laboratory; it was then produced in small quantities by heating alumina mixed with coal, in a porcelain tube, and passing over it a current of dry chlorine gas.

M. Ste. Claire Deville made farther improvements in this process, so as to make it in an apparatus as large as a gas retort and in quantities proportional, at a price of twenty-five cents per pound. To produce the reaction of sodium with the chloride of aluminium was the most difficult point of the entire process. M. Ste. Claire Deville used for the reduction the distillation of the chloride of aluminium over the sodium, which was placed in trays of copper enclosed in a tube. The temperature developed by the reaction is very great if the current of the chloride of aluminium be rapid; by this process it was found that it required at least ten pounds of sodium to produce one pound of aluminium, (part of the aluminium produced being destroyed at its formation by the scoriæ,) when by theory it required only two and a half pounds. This great loss of sodium and the difficulties in conducting this reaction on a large scale, were very great objections to the process.

All the aluminium at the Paris Exhibition was made by this process, and it was from a portion of this that M. Regnault made his investigations, and in which he found copper and iron. The copper came from the trays in which the reduction was made. The presence of these metals in small quantities will account for the peculiar physical properties which he ascribed to aluminium.

Circumstances having interrupted M. Ste. Claire Deville in the experiments which he was making on a large scale, the subject rested for a while here. In the meanwhile Heinrich Rose suggested and made experiments with cryolite, (a fluoride of aluminium and sodium,) and gave his views that this mineral was a valuable substance from which to produce aluminium.

Wöhler made experiments also with cryolite, and arrived at conclusions somewhat similar to Heinrich Rose. They both succeeded in producing some of the metal, but the results were not entirely satisfactory.

M. Ste. Claire Deville again resumed his experiments, but instead of distilling the chloride of aluminium on the metallic sodium, as in his first experiments, he fused in a crucible, in the manner pursued by Rose and Wöhler, using, however, with the double chloride of aluminium and sodium and the metallic sodium, the fluoride of calcium, (fluor spar,) or some cryolite as a flux. This experiment of M. Deville was very satisfactory, and the reduction in accordance with the theory.

While these experiments were in progress in Europe, similar ones were being made in this country by Mr. Alfred Monnier, in Camden, N. J.; to him credit is due for having first made aluminium in the United States. Having had opportunities for examining his processes for making the double chloride of aluminium and sodium, metallic sodium, and the modes of reduction, melting and refining the aluminium, the conclusion is satisfactory that the discoveries of science have been successfully applied to render the manufacture of this metal an industrial art.

Mr. Monnier in his experiments met with the same difficulties in the reduction. He found, however, by careful investigation and analysis, that the effect produced was also perfectly in accordance with the theory. When, after great difficulties, sufficient quantities of pure aluminium were obtained, and its properties as a metal carefully studied; it was found that it was not in the least degree oxidized by fusion with the nitrate of potash. This peculiar property causes a strong contrast between it and any well known metal, and this wonderful fact produced a new phase in the manufacture of aluminium. Owing to this discovery, the efforts which had been made to produce aluminium from perfectly pure material were found unnecessary.

By using pure materials for its manufacture, it was necessary to employ apparatus which was very costly, as it required that it should be free from any injurious substances.

By the facility with which aluminium can be refined, owing to its peculiar properties to resist oxidation, it can be manufactured from impure and crude materials, in apparatus which can be cheaply made of still cheaper material, and without the great care and watchfulness necessary in the manipulations, where pure materials are employed.

Since July, 1855, Mr. Monnier has made the double chloride by mixing alumina with salt (chloride of sodium) and coal, and by passing over this mass (ignited) a current of dry chlorine gas, (kaolin or common clay can be used instead of the alumina.) The double chloride runs out from the condenser in a stream, and is collected in a receiver; it becomes solid when cold.

The reaction is so complete that no chlorine is lost. It has already been manufactured at a cost of eight cents per pound, but the operations were carried on to a very limited extent. It is, however, clearly (to be) demonstrated that, with works of sufficient size and a proportional economy in manufacture, the double chloride of aluminium and sodium, can be produced at a cost not exceeding four and a half cents per pound.

In the manufacture of sodium Mr. Monnier has made considerable improvement; it has already been produced at a cost of twenty-five cents per pound.

In the manufacture of zinc (by the Belgian process) one retort produces about thirteen pounds of metal in 24 hours. In the manufacture of sodium the reduction is so quick that 52 pounds of this metal can be produced in a retort of the same size in the same space of time.

The reduction of zinc costs from two to two and a quarter cents per pound. The amount of ore necessary, being from a half to three-quarter cents per pound. Giving for the cost of one pound of metal about three to three and a quarter cents.

The reduction of sodium costs about . . .	4 cents per pound.
The carbonate of soda, 2½ lbs. at 4 cents, . .	10 " "
Giving for total cost of one pound of sodium, . .	14 "

Sodium can be manufactured on as large a scale as zinc, and when the workmen have the same practical experience in the manipulations, the price of reduction will be still farther reduced, so that the difference between it and zinc will be that of the first cost of carbonate of soda and the zinc ore.

It has already been shown that the double chloride of aluminium and sodium can be produced at a very low price; metallic sodium can also be made very cheaply; the reduction is readily effected in accordance with the theory, but the difficulty in uniting the metallic globules of aluminium when formed, is obviated by stirring at this point with a rod, and the destruction of the metal by the alkaline scoria is prevented by adding to the charge of the double chloride of aluminium and sodium, chloride of sodium and metallic sodium, either fluoride of calcium, (fluor spar,) or cryolite.

By these means the greater portion of the metal is united in one mass, the other portion of the metal in small globules remain with the slag, which can be removed mechanically, or by first digesting in water; there will however remain about ten per cent. with the slag. This will be explained by the following data. Theoretically:

250 parts of metallic Sodium produce
100 " " Aluminium;

70 parts are obtained in one metallic mass;
20 " " in metallic globules;

90 " being the nett produce.
10 " remain with the scoria.

Total, 100

The alkaline scoria contains large quantities of the chloride of sodium, that can be easily extracted by water, leaving an insoluble residue from which the fluoride of aluminium can be extracted by volatilization. The scoria containing the fluoride and the metallic aluminium is economically used by introducing it again with a new charge of the double chloride of aluminium and sodium, and metallic sodium, and by that means the loss of the metal is rendered very small.

Aluminium, when carefully removed from any slag, is readily fused in a crucible by itself; when in fusion (which is at a lower point than that required to fuse silver) the whole is stirred with a rod, and all the globules of metal are united in one mass with the greatest facility; at this point nitrate of potash can be added, (the stirring continued.)

All other metals are oxidized by this process; the refining is finished when the metal has a pure white color. It can now be poured into a mould of any shape.

Impure aluminium may be whitened by plunging it into caustic potash or soda, washing it quickly with distilled water, plunging it again into pure nitric acid, again washing quickly and thoroughly. The surface then has the fine white color of pure aluminium, which it retains unless afterwards polished. This operation has for its object to dissolve out the metals which darken the color of aluminium by their presence.

Aluminium forms alloys with nearly all the metals, but those which it forms with silver and copper are the most interesting.

Five parts of aluminium with one hundred parts of pure silver produce an alloy almost as hard as a silver coin, which contains about one-tenth of copper, so that sufficient hardness can be given to silver, without introducing into it a poisonous or an alterable metal. It has the advantage of being worked like silver in a pure state, possessing, however, greater hardness, and being capable of a higher polish.

Ten parts of aluminium and ninety parts of copper produce an alloy of a pale gold color, possessing great hardness and considerable malleability; its hardness is greater than that of bronze, in the proportion of fifty-one to forty-nine. It can be worked when warm, with the same facility as the best soft iron.

Twenty parts of aluminium and eighty of copper give to the alloy the color and brilliancy of fine gold, and at the same time sufficient hardness to scratch the alloy of gold employed in coin, without imparing in the slightest degree its malleability.

By an increase of the per centage of copper in alloys of aluminium the alloy is rendered brittle, showing that the metal must be either used pure or alloyed in small quantities with the copper.

This explains the peculiar properties ascribed to it by M. Regnault in his investigations on the physical properties of the aluminium prepared by M. Deville, exhibited at the Paris exhibition.

Numerous experiments have been made (without regard to economy of manufacture) to obtain the aluminium directly from the oxide alumina, or from the fluoride of aluminium.

But the results obtained by the use of this double chloride of aluminium and sodium, have fully demonstrated that it is the most economical mode by which to produce this metal. Theoretically it requires—

3·86 Chlorine, at 6 cents per pound, ...	·23 16-100
1·86 Alumina, at 3 " "	·05 58-100
5·68 Carbonate of Soda, at 4 cents per pound, .	·22 72-100
Total, ...	·51 46-100

Making for the materials for manufacturing one pound of aluminium, estimated at the market prices, 51½ cents. Practically it requires—

16 lbs. of the double chloride of aluminium and sodium, at 8 cts. per lb.,	$1 28
2¾ lbs. metallic sodium, at about 25 cents per lb., ...	70
Flux and cost of reduction, ...	2 02
Total, ...	$4 00

By manufacturing on a larger scale, and by using the slag as a flux instead of employing fresh material, the lowest cost will be reduced to the following:

10 lbs. of double chloride of aluminium and sodium, at 4½ cents per lb.,	$0 45
2½ lbs. of sodium, at 14 cents per lb., ...	35
Cost of reduction, ...	20
Total, ...	$1 00

It is seen that the actual cost of one pound of aluminium, when manufactured extensively, will be about double the theoretical cost as before estimated, (fifty-one cents.)

For the production of aluminium are used clay, salt, sulphur, manganese, lime and fluor spar, materials which are very abundant and cheap; all that is now required is practical experience, to reduce the price of the metal still nearer to the price of the raw materials, as has been before stated. The history of the useful arts contains numerous instances that, where skill and perfection of apparatus are required, difficulties are speedily overcome.

The density of aluminium when moulded is 2·56. The density of aluminium when rolled is 2·67. In equal weight with silver it is four times more voluminous. In equal weights with copper, bronze, brass and German silver, it possesses from three to three and a half times greater volume. In equal volumes with the above metals and alloys it possesses greater rigidity.

Mention has already been made of a very important property of aluminium when pure; that is to resist oxidation, a property which it possesses to a greater degree than the other metals.

Aluminium is not acted upon by nitric acid, hydrosulphuric acid, or by the organic acids; slightly by sulphuric acid. It is but little affected by fusion with sulphur; mustard is found to act upon it slightly. Its true solvent is hydrochloric acid.

When we compare it in these respects with those metals, which are acted upon by most of these acids giving salts, which are more or less poisonous, the comparison is favorable to aluminium, as its salts, if formed, are innocuous.

According to M. C. Tissier, aluminium is not changed by a solution of nitrate or sulphate of copper, but it is dissolved by a solution of chloride of copper with the separation of metallic copper. It is attacked, however, by a solution of nitrate or sulphate of copper when it contains chloride of sodium, and this proves that chloride of copper is formed by the presence of the chloride of sodium. Aluminium is not attacked by an aqueous solution of alum, or by one of chloride of sodium, but a mixture of the two dissolves it with an evolution of hydrogen, and this proves that chloride of aluminium is contained in the mixture.

Wheatstone long since showed that aluminium was as strongly electro-negative as platinum. Its sonorous qualities are very great, like that of crystal. Various are the uses which can be made of the aluminium and of its alloys with silver and copper. All the purposes for which it could be advantageously employed in virtue of its peculiar properties, of not tarnishing by exposure to atmospheric agencies, and its lightness combined with its extraordinary strength, would be far too tedious to enumerate. A few instances only will suffice of its adaptability for philosophical apparatus, for all articles for table, for service and ornament, for kitchen utensils, for the works of clocks and even watches, for trappings of harness, for plate and door knobs, keys, &c. Its sonorous qualities render it valuable for making bells. In the galvano-plastic arts it replaces platinum.

Aluminium is most easily soldered with its own alloys. The alloys most convenient are those with silver, zinc or tin, their point of fusion being below that of aluminium. The soldering may be done by means of a spirit lamp, and without any previous cleaning.

Pure aluminium can be easily distinguished from impure by its greater whiteness, its indistinct traces of crystallization; occasionally one or two well-defined hexagons can be recognized on the surface of the ingots. The impure has a bluish tint like zinc, and if the entire surface is not crystalline, the upper surface is always more so than in pure aluminium; the form of the crystals is also quite different.

In giving the theoretical proportion of material employed in the manufacture of aluminium, the relative cheapness of its production, its properties and strength when comparing it bulk for bulk with other metals, it is desired to demonstrate its valuable properties and uses, also to guard against the fictitious reports so current of its excessive cheapness.

Note.—The experiment of Sir H. Davy should be mentioned in the early production of this metal; he endeavored to produce it by passing the vapor of potassium over alumina at a white heat; he obtained only small grey particles interspersed with aluminate of potash.